

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. Applicants thank the Examiner for withdrawing the rejections made in the Office Action dated September 18, 2009.

Claims 1-10 and 12-15 are pending in the application and are submitted for consideration.

Rejections under 35 U.S.C. § 103

Claims 1-10 and 13-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,228,471 (hereinafter “Neerinck”) in view of U.S. Patent No. 6,821,497 (hereinafter “Moronuki”), which cites to JP 10-130865.

Evidence of unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art and presence of a property not possessed by the prior art, can rebut prima facie obviousness.¹ (M.P.E.P. §§ 716.02(a)(II)-(III)). Evidence of unexpected advantageous properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art. (M.P.E.P. § 716.02(b)(III)).

Independent claim 1 recites, “a first intermediate layer, said first intermediate layer consisting of at least one of Ti, Cr, TiC, TiN, TiCN, CrN or Cr₃C₂; a second intermediate layer deposited on top of said first intermediate layer, said second intermediate layer comprising a diamond-like nanocomposite composition; and a diamond-like carbon layer deposited on top of said second intermediate layer,” and is allowable over the prior art for at least displaying unexpected advantageous properties.

On page 2 of the Office Action, the Office asserts that Neerinck discloses a layered structure where alternating layers of DLN and DLC are deposited on a substrate. (Office Action, pg. 2). The Office also asserts that Moronuki discloses usage of a metal bridge layer such as titanium or chromium. (Office Action, pg. 2). On at least pages 7-9 of Applicants’ application², however, Applicants compare three coating types to one another, where the comparison proves that using elements in a layered structure such as disclosed in claim 1 of Applicants’ application, results in unexpected advantageous properties being attained. The

¹ Applicants do not concede that a prima facie case of obviousness has been made.

² Applicants’ application is a sworn document.

three coating types compared are the following: (a) DLN + DLC, (b) Ti + DLC, and (c) Ti + DLN + DLC. Coating types (a) and (b) are examples of prior art coating types. Coating type (a) is similar to Neerink and it is believed that coating (b) is analogous to Moronuki as Neerink and Moronuki are applied in the Office Action. Coating type (c) is an example of a layered structure covered by claim 1 of Applicants' application. Table 1, shown below, summarizes the results found for several performance categories when comparing the three coating types to one another and includes examples of where support for the results can be found in Applicants' application.

Table 1

Coating type	Performance					
	Adhesion HF value	Adhesion Critical load to obtain delamination	Scratch resistance	Performance in high shear applications	Performance in high impact loading applications	Life time in high impact aluminum metal forming application
(a) DLN + DLC (pg. 7 of app.)	3-5 (pg. 8 of app.)	15-30 N (pg. 8 of app.)		- (pg. 8 of app.)	- (pg. 8 of app.)	
(b) Ti + DLC (pgs. 7-8 of app.)	1-3 (pg. 8 of app.)	15-27 N (pg. 8 of app.)		- (pg. 8 of app.)	+ - (pg. 8 of app.)	
(c) Ti+ DLN + DLC (pg. 8 of app.)	1-3 (pg. 8 of app.)	22-35 N (pg. 8 of app.)	+ (pg. 8 of app.)	++ (pg. 8 of app.)	++ (pg. 8 of app.)	3-4 times the life time of coating type (b) (pgs. 8-9 of app.)

In summary, Table 1 illustrates that coating type (c) displays unexpected advantageous properties. Specifically, coating type (c) displays better adhesion attributes than coating type (a) and displays the ability to withstand a greater critical load before delamination occurs than both coating types (a) and (b). Coating type (c) also displays better scratch resistance than coating types (a) and (b). Coating type (c) is the only coating type that displays excellence in both high shear applications and high impact loading applications. The life time of coating in high impact aluminum metal forming applications of coating type (c) is 3 to 4 times higher than the lifetime of coating type (b). Increased life time means less production steps,

maintenance, and costs. For example, the better the performance of the coating, the better the wear and/or corrosion resistance, thereby increasing the life time of the coated object.

The excellent performance of coating type (c) was unexpected; there was no indication that the excellent performance results could be obtained by amending coating type (a). Accordingly, “a first intermediate layer, said first intermediate layer consisting of at least one of Ti, Cr, TiC, TiN, TiCN, CrN or Cr₃C₂; a second intermediate layer deposited on top of said first intermediate layer, said second intermediate layer comprising a diamond-like nanocomposite composition; and a diamond-like carbon layer deposited on top of said second intermediate layer,” as recited in claim 1 is allowable over the prior art for at least displaying unexpected advantageous properties.

Independent claims 13 and 14 recite similar and/or analogous elements to claim 1 and are allowable at least for the same reasons that independent claim 1 is allowable. Claims 2-10 and 15 depend from claim 1 or claim 14 and are allowable for at least the reasons set forth above, without regard to the further patentable elements contained in claims 2-10 and 15. Favorable reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection is respectfully requested.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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